Amendments to the Specification

Please amend the specification as follows:

(1) Please amend the paragraph commencing at page 25, line 4 (Brief Description of Figure 1) to read as follows:

- - **FIGURES 1A-1D: Direct binding of the antibody produced from the 3H7 clone to FcγRIIB and FcγRIIA.**

A **(FIGS. 1A-1B)** The direct binding of antibodies from some of the hybridoma cultures to the FcγRIIs were compared to a commercially available anti-FcγRII antibody in an ELISA assay where the plate was coated with the receptors. Different dilutions (1:10) of the supernatants were incubated on the plate. The bound antibodies were detected with a goat anti-mouse HRP conjugated antibody and the absorbance was monitored at 650 nm.

B. **(FIGS. 1C-1D)** The direct binding of the antibody from the 3H7 hybridoma culture (supernatant n. 7 from the figures 1A**-B**), in crude (~~**left panel**~~ **FIG. 1C**) and purified form (~~**right panel**~~ **FIG. 1D**), to FcγRIIA and FcγRIIB, were compared using the same ELISA assay as in 1A. - -

(2) Please amend the paragraph commencing at page 26, line 10 (Brief Description of Figure 5), to read as follows:

- - **FIGURES 5A-5C: Comparison of the direct binding ability to FcγRIIA and FcγRIIB of the antibody purified from clone 2B6 compared to other three commercially available monoclonal antibodies against FcγRII.**

The binding of 2B6 antibody to FcγRIIA (**FIG. 5B** ~~**top right panel**~~) and FcγRIIB (**FIG. 5A** ~~**top left panel**~~) is compared to that of three other commercially available

antibodies raised against FcγRII. The ELISA format used is the same described in figure 4. **FIG. 5C shows IIB/IIA binding of 2B6 and FL18.26.** - -

(3) Please amend the paragraph commencing at page 26, line 16 (Brief Description of Figure 6), to read as follows:

- - **FIGURES 6A and 6B: Competition in binding of the antibody produced from clone 2B6 and aggregated biotinylated human IgG to FcγRIIB.**

~~Panel~~ FIG. 6A

The ability of the antibody present in the supernatant from the clone 2B6 to compete for binding to FcγRIIB with aggregated biotinylated human IgG was measured using a blocking ELISA experiment.

The 2B6 antibody competition ability was compared to that of a negative supernatant from hybridoma and to that of 3H7 antibody.

An ELISA plate coated with FcγRIIB was incubated with different dilutions (1:10) of the supernatants. After washes the plate was incubated with a fixed amount of aggregated biotinylated human IgG (1 mg/well) and the bound aggregates were detected with Streptavidin-HRP conjugated. The reaction was developed with TMB and the absorbance was monitored at 650 nm.

~~Panel~~ FIG. 6B

The same blocking ELISA described in panel A was performed with purified 2B6 antibody and the data from one concentration of blocking antibody used (4 mg/well) were represented in a bar diagram. The 2B6 ability to block aggregated human IgG binding to FcγRIIB was compared to that of a mouse IgG1 isotype control.

(4) Please amend the paragraph commencing at page 27, line 3 (Brief Description of Figure 7), to read as follows:

- - **FIGURES 7A-7C: Competition of 2B6 antibody and aggregated biotinylated human IgG in binding to FcγRIIB using a double-staining FACS assay.** A double staining FACS assay was performed to characterize the 2B6 antibody using CHO-K1 cells that had been stably transfected with full-length mammalian FcγRIIB.

~~**Panel**~~ **FIG. 7**A

The transfectant cells were stained with mouse IgG1 isotype control followed by a goat anti-mouse-FITC conjugated antibody and Streptavidin-PE.

~~**Panel**~~ **FIG. 7**B

The transfectant cells were stained with aggregated biotinylated human IgG after being stained with mouse IgG1 isotype control and labeled with a goat anti-mouse-FITC conjugated antibody to detect the bound monoclonal antibody and with Streptavidin-PE conjugated to detect the bound aggregates..

~~**Panel**~~ **FIG. 7**C

The cells were stained with 2B6 antibody, the antibody was removed by washes and the cells were incubated with aggregated biotinylated human IgG. Cells were washed and labeled with a goat anti-mouse-FITC conjugated antibody to detect the bound monoclonal antibody and with Streptavidin-PE conjugated to detect the bound aggregates. - -

(5) Please amend the paragraph commencing at page 27, line 21 (Brief Description of Figure 8), to read as follows:

- - **FIGURES 8A-8C: Monoclonal anti FcγRIIB antibodies and CD20 co-stain of human B lymphocytes.**

Cells from human blood ("buffy coat") were stained with anti-CD20 -FITC conjugated antibody, to select the B lymphocytes population, as well as 3H7 and 2B6. The bound anti-FcγRIIB antibodies were detected with a goat anti-mouse-PE conjugated antibody.

FIG. 8A. Cells were co-stained with anti-CD20-FITC antibody and mouse IgG1 isotype control.

FIG. 8B. Cells were co-stained with anti-CD20-FITC antibody and 3H7 antibody.

FIG. 8C. Cells were co-stained with anti-CD20-FITC antibody and 2B6 antibody. - -

(6) Please amend the paragraph commencing at page 27, line 30 (Brief Description of Figure 9), to read as follows:

- - **FIGURES 9A-9D: Staining of CHO cells expressing FcγRIIB.**

A. **(FIGS. 9A-9B)** CHO/IIB cells were stained with mouse IgG1 isotype control (**~~left panel~~ FIG. 9A**) and 3H7 antibody (**~~right panel~~ FIG. 9B**).

B. **(FIGS. 9C-9D)**CHO/IIB cells were stained with mouse IgG1 isotype control (**~~left panel~~ FIG. 9C**) and 2B6 antibody (**~~right panel~~ FIG. 9D**).

The cell-bound antibodies were labeled with a goat anti-mouse-PE conjugated antibody. - -

(7) Please amend the paragraph commencing at page 28, line 4 (presently, Brief Description of Figure 10), to read as follows:

- - **FIGURES 10A-10G: Binding of humanized antibodies to FcγRIIB-expressing CHO cells.**

CHO cells expressing huFcγRIIB were incubated with 3H7 antibody (FIG. 10A), 2B6 antibody (FIG. 10B), 2E1 antibody (FIG. 10C), 2H9 antibody (FIG. 10D), 1D5 antibody (FIG. 10E), 2D11 antibody (FIG. 10F) and 1F2 antibody (FIG. 10G). The human aggregated IgG were detected with goat anti-human-IgG-FITC. Samples were analyzed by FACS. ……isotype control + goat anti-huIgG-FITC, ——isotype control + aggregated huIgG + goat anti-huIgG-FITC, ▬▬anti-FcγRIIB antibody (2B6, 3H7, 2H9, 1D5, 2D11 and 1F2) + aggregated huIgG + goat anti-human-IgG-FITC. The amount of each antibody bound to the receptor on the cells was also detected (insert) on a separate set of samples using a goat anti-mouse PE-conjugated antibody.

FIGURES 11A-11P: Double FACS Staining with Human PBMCs.

Human PBMCs were stained with 2B6 (FIGS. 11B,11C, 11H, 11K and 11L), 3H7 (FIGS. 11D, 11E, 11I, 11M and 11N), and 1V.3 (FIGS. 11F, 11G, 11J, 11O and 11P) antibodies , as indicated on the right side of the panel, followed by a goat anti-mouse-Cyanine(Cy5) conjugated antibody (two color staining using anti-CD20-FITC conjugated antibody for B lymphocytes (FIGS. 11B, 11D and 11F), anti-CD14-PE conjugated antibody for monocytes (FIGS. 11K, 11M and 11O), anti-CD56-PE conjugated antibody for NK cells (FIGS. 11H, 11I and 11J) and anti-CD16-PE conjugated antibody for granulocytes (FIGS. 11C, 11E, 11G, 11L, 11N and 11P). Figure 11A demonstrates staining results for monocytes, B lymphocytes and granulocytes.

FIGURE 12A-12B: β-Hexaminidase Release Assay.

A. Schematic representation of β-hexaminidase release assay. **(FIG. 12B)** Transfectants expressing human FcγRIIB were sensitized with mouse IgE and challenged with $F(ab')_2$ fragments of a polyclonal goat anti-mouse IgG to aggregate FcεRI. Crosslinking occurs because of the ability of the polyclonal antibody to recognize the light chain of the murine IgE antibody bound to FcεRI. Transfectants sensitized with murine IgE and preincubated with 2B6 antibody were also challenged with $F(ab')_2$ fragments of a polyclonal goat anti-mouse IgG to cross link FcεRI to FcγRIIB.

B. β-hexoaminidase release induced by goat anti-mouse $F(ab)_2$ in RBL-2H3 cells expressing human FcγRIIB. **(FIG. 12A)** The release β-hexosaminidase activity is expressed as a percentage of the released activity relative to the total activity. - -

(8) Please amend the paragraph commencing at page 28, line 4 (presently, Brief Description of Figure 11), to read as follows:

- - **FIGURES ~~11~~ 13A-13C: Ovarian and Breast carcinoma cell lines express Her2/neu to varying levels.**

Staining of ~~A)~~ Ovarian IGROV-1 **(FIG. 13A)** with purified ch4D5, ~~B)~~ Ovarian OVCAR-8 **(FIG. 13B)** with purified 4D5 antibody, and ~~C).~~ Breast cancer SKBR-3 **(FIG. 13C)** cells with purified ch4D5 followed by goat anti-human-conjugated to phycoerythrin (PE). The relevant isotype control IgG1 is indicated the left of the staining with anti-Her2/neu antibody. - -

(9) Please amend the paragraph commencing at page 28, line 21 (presently, Brief Description of Figure 12), to read as follows:

- - **FIGURES ~~12~~ 14A-14T: Elutriated Monocytes express all FcγRs:**

A. MDM obtained from donor 1, **propagated in human serum (FIGS. 14A, 14C, 14E and 14G) or human serum and GMCSF (FIGS. 14B, 14D, 14F and 14H);**

B. MDM obtained from donor 2; propagated in human serum **(FIGS. 14I, 14K, 14M and 14O)** or human serum and GMCSF **(FIGS. 14J, 14L, 14N and 14P);**

C. Monocytes thawed and stained immediately **(FIGS. 14Q-14T)**.

Monocyte-derived macrophages were stained with anti-bodies specific for human FcγR receptor. The solid histogram in each plot represents the background staining. The clear histogram within each panel represents the staining with specific anti-human FcγR antibodies. - -

(10) Please amend the paragraph commencing at page 28, line 21 (presently, Brief Description of Figure 13), to read as follows:

- - **FIGURES ~~13~~ 15A-15B: Ch4D5 mediates effective ADCC with ovarian and breast cancer cell lines using PBMC.**

Specific lysis subtracted from antibody-independent lysis is shown (for **FIG. 15**A) Ovarian tumor cell line, IGROV-1 at an effector: target ratio of 75:1, and (for **FIG. 15**B) Breast tumor cell line SKBR-3 at an effector:target ratio of 50:1 with different concentration of ch4D5 as indicated. - -

(11) Please amend the paragraph commencing at page 29, line 3 (presently, Brief Description of Figure 14), to read as follows:

- - **FIGURE<u>S</u> ~~14~~ <u>16A-16C</u>: Histochemical staining of human ovarian ascites shows tumors cells and other inflammatory cells.**

<u>(FIG. 16</u>A). H & E stain on ascites of a patient with ovarian tumor. Three neoplastic cells can be identified by the irregular size and shape, scattered cytoplasm, and irregular dense nuclei. **<u>(FIG. 16</u>**B). Giemsa stain of unprocessed ascites from a patient with serous tumor of the ovary shows two mesothelial cells placed back to back indicated by short arrows. Also shown is a cluster of five malignant epithelial cells indicated by the long arrow. Erythrocytes are visible in the background. **<u>(FIG. 16</u>**C). Giemsa stain of another patient with serous tumor of the ovary indicating a cluster of cells composed of mesothelial cells, lymphocytes, and epithelial neoplastic cells(arrow). - -

(12) Please replace the paragraph commencing at page 135, line 30 of the Specification with the following paragraph:

- - The direct binding of different batches of hybridoma cultures to FcγRIIA and FcγRIIB were compared using an ELISA assay (Figure 1A). Supernatants numbered 1, 4, 7, 9, and 3 were tested for specific binding and their binding was compared to a-commercially available antibody, FL18.26. As shown in Figure 1A~~**(left panel)**~~, supernatant from clone 7 has the maximal binding to FcγRIIB, which is about four times higher under saturating conditions than the binding of the commercially available antibody to FcγRIIB. However, the supernatant from clone 7 has hardly any affinity for FcγRIIA, as seen in ~~**the right panel**~~ **<u>Figure 1B</u>**, whereas the commercially available antibody binds FcγRIIA at least 4 times better. - -

(13) Please replace the paragraph commencing at page 136, line 7 of the Specification with the following paragraph:

- - The binding of crude 3H7 supernatant **(Figure 1C)** and purified 3H7 supernatant was measured ~~(Figure 1B~~ **Figure 1D**). In each case, the supernatant was supplied at a concentration of 70 μg/ml and diluted up to 6-fold. As shown in Figure 1**C**, upon saturating conditions, the 3H7 supernatant binds FcγRIIB four times better than it binds FcγRIIA. Upon purification with an protein G column, the absolute binding of the 3H7 supernatant to each immunogen improves. - -

(14) Please replace the paragraph commencing at page 137, line 11 of the Specification with the following paragraph:

- - The binding of the antibody produced from clone 2B6 to FcγRIIA and FcγRIIB is compared to that of three other commercially available antibodies, AT10, FL18.26, and IV.3, against FcγRII in an ELISA assay. As seen in Figure 5**A**, ~~panel A,~~ the antibody produced from clone 2B6 binds FcγRIIB up to 4.5 times better than the other commercially available antibodies. Additionally, the antibody produced from clone 2B6 has minimal affinity for FcγRIIA, whereas the other three commercially available antibodies bind FcγRIIA in a saturatable manner and twice as much as the antibody from clone 2B6 binds FcγRIIA (Figure 5**B** ~~, panel B~~). - -

(15) Please replace the paragraph commencing at page 137, line 31 of the Specification with the following paragraph:

- - A double staining FACS assay was used to characterize the antibody produced from clone 2B6 in CHO cells that had been transfected with full-length mammalian FcγRIIB.

As shown in Figure 7<u>**C**</u>, ~~**panel C,**~~ the antibody produced from clone 2B6 effectively blocks the binding of aggregated IgG to the FcγRIIB receptor in CHO cells since no staining is observed for biotinylated aggregated IgG after the cells were pre-incubated with the monoclonal antibody. The cells are only stained in the lower right panel, indicating that most of the cells were bound to the monoclonal antibody from the 2B6 clone. In the control experiments, using IgG1 as the isotype control, ~~**panel**~~ <u>**FIG. 7**</u>A, when the cells are stained with the isotype labeled IgG, no staining is observed since the monomeric IgG does not bind FcγRIIB with any detectable affinity, whereas in ~~**panel**~~ <u>**FIG. 7**</u>B, about 60% of the cells are stained with aggregated IgG, which is capable of binding FcγRIIB. - -

(16) Please replace the paragraph commencing at page 138, line 11 of the Specification with the following paragraph:

- - A double staining FACS assay was used to characterize the antibody produced from clones 2B6 and 3H7 in human B lymphocytes. Cells were stained with anti-CD20 antibody which was FITC conjugated, to select the B-lymphocyte population, as well as the antibodies produced from clone 3H7 and 2B6, labeled with goat anti-mouse peroxidase. The horizontal axis represents the intensity of the anti-CD20 antibody fluorescence and the vertical axis represents the intensity of the monoclonal antibody fluorescence. As shown in Figure<u>**s**</u> 8<u>**B and 8C**</u>, ~~**panels,**~~ cells are double stained with the anti-CD20 antibody as well as the antibodies

produced from clones 2B6 and 3H7, however, the antibody produced from clone 2B6 shows more intense staining than that produced from clone 3H7. ~~**Panel**~~ **Figure 8**A shows the staining of the isotype control, mouse IgG1. - -

(17) Please replace the paragraph commencing at page 138, line 22 of the Specification with the following paragraph:

- - CHO cells, stably expressing FcγRIIB were stained with IgG1 isotype control (Figure**s** 9A **and B**~~**; left panel**~~) or with supernatant from the 3H7 hybridoma (Figure**s** 9**C and D**~~**B; right panel**~~). Goat anti-mouse peroxidase conjugated antibody was used as a secondary antibody. The cells were then analyzed by FACS; cells that are stained with the supernatant from the 3H7 hybridoma show a strong fluorescence signal and a peak shift to the right; indicating the detection of FcγRIIB in the CHO cells by the supernatant produced from the 3H7 hybridoma. Cells stained with the supernatant from the 2B6 hybridoma, also show a significant fluorescence, as compared to cells stained with IgG1, and a peak shift to the right, indicating the detection of FcγRIIB in the CHO cells by the supernatant produced from the 2B6 hybridoma. - -

(18) Please replace the paragraph commencing at page 139, line 2 of the Specification with the following paragraph:

- - Transfectants expressing human FcγRIIB were sensitized with mouse IgE and challenged with $F(ab')_2$ fragments of a polyclonal goat anti-mouse IgG to aggregate FcεRI. Crosslinking occurs because of the ability of the polyclonal antibody to recognize the light chain of the murine IgE antibody bound to FcεRI. This experiment is schematically shown in Figure **12B** ~~**10A**~~. Transfectants sensitized with murine IgE and preincubated with 2B6 antibody were also

challenged with $F(ab')_2$ fragments of a polyclonal goat anti-mouse IgG to cross link FcεRI to FcγRIIB. As shown in Figure **12A** ~~**10B**~~, β-hexoaminidase release of a lower magnitude was observed when cells which were pre-incubated with 2B6 antibody and IgE were challenged with goat anti mouse $F(ab')_2$. As seen in Figure **12A** ~~**10B**~~, 2B6 antibody does not block the inhibitory receptor activity. Rather cross-linking with FcεRI activates the inhibitory pathway and results in a significant decrease in β-hexosaminidase release. These date also show that human FcγRIIB inhibitory receptor can effectively signal in rat basophils. - -

(19) Please replace the paragraph commencing at page 139, line 16 of the Specification with the following paragraph:

- - In order to determine whether IGROV-1, OVCAR-8, and SKBR-3 cells express the Her2neu antigen, cells were stained with either purified 4D5 or ch4D5 antibody on ice; the unbound antibody was washed out with PBS/BSA buffer containing sodium azide, and the binding of 4D5 or ch4D5 was detected by goat anti-mouse or goat anti-human antibody conjugated to PE (Jackson Laboratories), respectively. An irrelevant IgG1 antibody (Becton Dickinson) served as a control for non-specific binding. As shown in Figure**s 13A-13C** ~~**11**~~, the ovarian tumor cell lines express less Her2/neu antigens than the breast carcinoma cell line and evaluating these cell lines in parallel will determine the stringency of tumor clearance by an anti-FcγRIIB antibody of the invention. - -

(20) Please replace the paragraph commencing at page 139, line 25 of the Specification with the following paragraph:

- - Human monocytes are the effector population involved in ADCC that express both activating and inhibitory receptors. The expression of FcγRs was tested by FACS analysis using several lots of frozen monocytes as these cells will be adoptively transferred as effectors to investigate the role of ch2B6 in tumor clearance. Commercially obtained frozen elutriated monocytes were thawed in basal medium containing 10% human AB serum and in basal medium with human serum and 25 - 50 ng/ml GM-CSF. Cells were either stained directly or allowed to mature to macrophages for 7-8 days (MDM), lifted off the plastic, and then stained with IV.3-FITC (anti-hu FcγRIIA), 32.2-FITC (anti-FcγRI), CD16-PE (Pharmingen) or 3G8 (anti-FcγRIII)-goat anti-mouse-PE, 3H7 (anti-FcγRIIB), and CD14 marker for monocytes (Pharmingen), along with relevant isotype controls. A representative FACS profile of MDM from two donors, depicting FcγR expression on freshly thawed monocytes and cultured monocytes, is shown in Figure ~~12~~ **<u>14</u>**. These results indicate that FcγRIIB is modestly expressed in monocytes (5-30% depending on the donor). However this expression increases as they mature into macrophages. Preliminary data show that tumor-infiltrating macrophages in human tumor specimens are positively stained for FcγRIIB (data not shown). The pattern of FcγRs and the ability to morphologically differentiate into macrophages was found to be reproducible in several lots of frozen monocytes. These data indicate that this source of cells is adequate for adoptive transfer experiments. - -

(21) Please replace the paragraph commencing at page 140, line 12 of the Specification with the following paragraph:

- - The ADCC activity of anti-Her2/neu antibody was tested in a europium based assay. The ovarian cell line, IGROV-1, and the breast cancer cell line, SKBR-3, were used as labeled targets in a 4 h assay with human PBL as effector cells. Figure**s 15A and B** ~~13~~ indicate~~s~~ that ch4D5 is functionally active in mediating lysis of targets expressing Her2neu. The effect of an antibody of the invention on the ADCC activity of the anti-Her2/neu antibody is subsequently measured. - -

(22) Please replace the paragraph commencing at page 144, line 2 of the Specification with the following paragraph:

- - Ascites from two different patients with ovarian carcinoma were stained by Hematoxylin and Eosin (H & E) and Giemsa to analyze the presence of tumor cells and other cellular types. The result of the histochemical staining is shown in Figure **16** ~~14~~. - -